

REMARKS

INTRODUCTION:

Claims 1, 18, 31 and 32 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kidorf et al., and claims 33-35 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ma et al.

Claims 5 and 22 were rejected under 35 U.S.C. § 102(b) as being unpatentable over Kidorf et al. in view of Mitsuda et al.

These rejections are respectfully traversed.

In accordance with the foregoing, claims 1, 18 and 31-35 have been amended and new claim 36 has been added. No new matter has been added.

Claims 1-12, 14 and 18-36 are pending and under consideration.

Reconsideration is requested.

REJECTION UNDER 35 U.S.C. § 102:

In the Office Action, at pages 2-4, claims 1, 18, 31 and 32 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kidorf et al., and claims 33-35 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ma et al.

These rejections are traversed and reconsideration is requested.

It may be helpful to generally describe the environment.

Erbium doped fiber amplifiers (EDFAs) generally boost signal wavelengths in the 1530-1560 nm range, known as the conventional or "C" band and may be designed to amplify signals in the 1560-1610 nm range, known as the long or "L" band. A few meters of fiber of EDFAs may be doped with erbium so that a 1480 or 980 nm pump laser "excites" the erbium ions in the doped fiber. As the "excited" erbium ions fall to the ground state, the erbium ions release their excess energy as particles of light in phase and at exactly the same wavelength as the incoming optical signal, becoming clones of the stimulating optical signal and actually becoming part of the signal and strengthening the signal.

Raman amplification is used to harness the natural attenuation effect of Raman scattering so that photons of the residual pump beam light interact with the molecules of the glass, causing pump beam photons to acquire the same longer wavelength as the optical signal and to be added to the incident signal along many kilometers of transmission fiber before they are converted or attenuated, achieving "distributed amplification." Thus, although the pump power is injected into the fiber at the location where the amplifier equipment is located, the gain occurs over a long distance from the amplifier site.

A part of the excitation light may be used to produce Raman amplification with respect to optical signals of a second wavelength band, and the Raman amplified signals may be amplified by the optical amplifier. A possible benefit (not required by the claims) is an improved S/N ratio for the second wavelength band.

Independent claims (1, 18, and 31-35) have been amended to distinguish more clearly how the present invention differs from the cited prior art. It is respectfully submitted that the amended independent claims are in allowable form, and thus, the dependent claims are also allowable for at least the reasons that the amended independent claims are allowable.

Thus, it is respectfully submitted that claims 1, 18, 31 and 32 are allowable under 35 U.S.C. § 102(b) and are not anticipated by Kidorf et al., and claims 33-35 are allowable under 35 U.S.C. § 102(b) and are not anticipated by Ma et al.

REJECTION UNDER 35 U.S.C. § 103:

In the Office Action, at pages 2-4, claims 5 and 22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kidorf et al. in view of Mitsuda et al. Claims 6, 7, 23, and 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kidorf et al. in view of Mitsuda et al. as applied to claims 5 and 22, and further in view of Sun et al. '11/97. Claims 8 and 25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kidorf et al. Claims 9 and 26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kidorf et al. in view of Antos et al. Claims 10-12 and 27-29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kidorf et al. as applied to claim 1, and further in view of Kosaka et al. Claims 14 and 30 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kidorf et al. in view of Mitsuda et al. as applied to claim 5 above, and further in view of Kosaka.

In the present invention, the WDM light is separated into the first and second wavelength bands and then is amplified. The wavelength band of the signal light amplified by the optical amplifier that feeds the excitation light to the transmission path is different from the wavelength band of the signal light that is Raman amplified, as is set forth in independent claims 1, 18, and 31-35, as well as in the new claim 36, and which is not taught or suggested by the cited prior art. Thus, it is respectfully submitted that amended independent claims 1, 18, 31-35 and new claim 36 are non-obvious and are allowable under 35 U.S.C. § 103(a) over the cited prior art. Since dependent claims incorporate the limitations of the independent claims from which they depend, it is respectfully submitted that since each of the claims recited above for rejection under 35 U.S.C. § 103(a) is a dependent claim, and dependent claims depend from the above-discussed amended independent claims, dependent

claims 5 and 22, 6, 7, 23, and 24, 8 and 25, 9 and 26, 10-12 and 27-29, and 14 and 30 are patentable over the prior art for at least the reasons discussed above for the amended independent claims.

NEW CLAIM:

New claim 36 recites that the features of the present invention include an optical amplifier comprising: a multi-band amplification section having first and second sides, comprising: a C-band optical amplifier to amplify optical signals in a C-band with excitation light; and an L-band optical amplifier to amplify optical signals in an L-band with excitation light, the L-band optical amplifier being provided in parallel with the C-band optical amplifier, the multi-band amplification section outputting residual excitation light from at least the first side thereof; and a Ramen amplification unit provided in series with the multi-band amplification section, at the first side of the multi-band amplification section, to produce Ramen amplification for the optical signals in the L-band with the residual excitation light output from the multi-band amplification section.

Nothing in the prior art teaches or suggests the subject matter of claim 36. It is submitted that this new claim distinguishes over the prior art.

CONCLUSION:

In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot, and further, that all pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance, which action is earnestly solicited.

If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited by the Examiner contacting the undersigned attorney for a telephone interview to discuss resolution of such issues.

If there are any underpayments or overpayments of fees associated with the filing of this Amendment, please charge and/or credit the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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